CS142 **Assignment 7** Spring 2025

Given: Sat, Mar 8
Due: Thu, Mar 13, 3:00 p.m.

1. (24%) Create a generic function `increment(start, stop, x)` that adds `x` to every element in the range `[start,stop)`. The addition is done using the + operator. The arguments `start` and `stop` are bidirectional iterators. Write a test driver.

2. (24%) Create a generic function `average({elements})` that returns the average of all the given elements. For example, `average({x, y, z})` returns $(x + y + z)/3$. The argument is an initializer list that is assumed not to be empty. The returned value should be of the same type as the arguments. For the sake of the exercise, don't use other STL algorithms in the implementation of the function. Write a test driver.

3. (28%) Create a generic function

   ```
   print_if(start, stop, condition, out)
   ```

   that prints to output stream `out` all the elements in the range `[start,stop)` that satisfy the unary predicate `condition`. The elements are printed on separate lines. The arguments `start` and `stop` are bidirectional iterators. Test your function by printing all the strings more than 3 characters long in some vector of strings.

4. (24%) Create a class of function objects called `StartsWith` that satisfies the following specification: when initialized with character *c*, an object of this class behaves as a unary predicate that determines if its string argument starts with *c*. For example, `StartsWith('a')` is a function object that can be used as a unary predicate to determine if a string starts with an `a`. So `StartsWith('a')("alice")` would return true but `StartsWith('a')("bob")` would return false. The function objects should return false when called on an empty string. Test your function objects by using one of them together with the STL algorithm `count_if` to count the number of strings that start with some letter in some vector of strings.